

# PATENT SPECIFICATION

(11) 1 270 799

## DRAWINGS ATTACHED

- (21) Application No. 48523/68 (22) Filed 14 Oct. 1968  
 (23) Complete Specification filed 30 Sept. 1969  
 (45) Complete Specification published 12 April 1972  
 (51) International Classification H02J 7/00  
 (52) Index at acceptance H2H 2A3 2A4 8E3  
 (72) Inventors ANTONY PETER ROYLE and REGINALD PATRICK BALL



## (54) DEVICE FOR CONNECTING BATTERIES IN PARALLEL

(71) We, JOSEPH LUCAS (INDUSTRIES) LIMITED, a British Company, of Great King Street, Birmingham 19, do hereby declare the invention for which we pray that a Patent may be granted to us, and the method by which it is to be performed to be particularly described in and by the following statement:—

This invention relates to a device for connecting batteries in parallel. The device is intended for use where a slave battery is to be connected in parallel with a flat battery of a road vehicle, thereby enabling the vehicle to be started.

A device according to the invention comprises in combination first and second terminals for connection to a first battery, third and fourth terminals for connection to a second battery, a first circuit which is completed when the first and second terminals are connected to the first battery, the first circuit including a relay capable of being energised by the first battery unless the first battery is substantially useless, a normally open contact controlled by the relay, a second circuit connected between the third and fourth terminals and including the normally open contact and an electromagnetic coil, means operable upon energisation of the electromagnet coil for completing a circuit from the first and second terminals to the third and fourth terminals, and means for ensuring that the electromagnet coil is energised only if the batteries are connected the correct way round.

The accompanying drawing illustrates one example of the invention.

Referring to the drawing, there are provided first and second terminals 11, 11a and 12, 12a which in use are intended for connection to a flat battery, each terminal being in the form of a crocodile clip, the two parts of which are insulated from one another. The terminals 11, 12a are interconnected through a diode 13 and a relay coil 14 in series, and connected across the coil 14 is a warning lamp 15.

There are further provided third and fourth

terminals 16, 17 which are intended for connection to a slave battery which is to be used to start a vehicle with which the flat battery is associated. The terminal 16 is connected to a fixed contact 18 of an electromagnet having a further fixed contact 19 connected to the terminal 11a, and a movable contact 21 which bridges the contacts 18, 19 when the coil 22 of the electromagnet is energised. One end of the coil 22 is connected to the terminal 12, and its other end is connected to the terminal 16 through a resistor 31, a normally open contact 23 operable by the relay coil 14, and a diode 24 in series with the contact 23. The series connection coil 22, resistor 31 and contact 23 is bridged by a further warning lamp 26, and the contact 21 is connected to the terminals 12, 17 through a relay 32 which when energised opens a contact 33 connected across the resistor 31.

In use, the terminals 11 and 12 are connected to the flat battery, and provided they are correctly connected the diode 13 can conduct and current flows through the relay coil 14. Unless the battery is so flat that it is virtually useless, there will be sufficient power to operate the relay coil 14, so that the contact 23 closes. At the same time the warning lamp 15 is illuminated.

The terminals 16 and 17 are connected to the slave battery, and if they are correctly connected, the diode 24 can conduct, and the warning lamp 26 is illuminated to indicate that the correct connection has been made. Assuming also that the contact 23 has closed, the electromagnet is energised to close contact 21 and complete a circuit connecting the batteries in parallel. When the contact 21 closes, the relay 32 is energised to open the contact 33 and remove the short from resistor 31. This arrangement provides a relatively high pull-in current for the coil 22, the current being reduced as soon as the contact 33 opens.

It will be appreciated that if either battery is incorrectly connected, no damage results. If

at any time either clip is removed, the relay 14 is de-energised and the contact 21 opens.

**WHAT WE CLAIM IS:—**

- 5 1. A device for connecting batteries in parallel comprising in combination first and second terminals for connection to a first battery, third and fourth terminals for connection to a second battery, a first circuit which is completed when the first and second terminals are connected to the first battery, the first circuit including a relay capable of being energised by the first battery unless the first battery is substantially useless, a normally open contact controlled by the relay, a second circuit connected between the third and fourth terminals and including the normally open contact and an electromagnet coil, means operable upon energisation of the electromagnet coil for completing a circuit from the first and
- 10
- 15

second terminals to the third and fourth terminals, and means for ensuring that the electromagnet coil is energised only if the batteries are connected the correct way round.

2. A device as claimed in claim 1 whereby the means for ensuring that the electromagnet is energised only if the batteries are connected the correct way round is a diode connected in series with the coil of the electromagnet.

3. A device for connecting batteries in parallel comprising the combination of parts arranged and adapted to operate substantially as described with reference to the accompanying drawing.

**MARKS & CLERK,**  
Chartered Patent Agents,  
Agents for the Applicants.

---

Printed for Her Majesty's Stationery Office by the Courier Press, Leamington Spa, 1972.  
Published by the Patent Office, 25 Southampton Buildings, London, WC2A 1AY, from which copies may be obtained.

